

REMARKS

Claims 1 through 8 are pending in this Application, claim 1 being the only independent claim.

For reasons which should be apparent from the arguments presented *infra*, Applicant submits that the imposed rejection under 35 U.S.C. § 103 is not factually or legally viable and should be withdrawn. As will also be apparent, the imposed rejection apparently stems from an incomplete appreciation of the claimed invention vis-à-vis the applied prior art.

Claims 1 through 8 were rejected under 35 U.S.C. § 103 for obviousness predicated upon Momota et al. and Watanabe et al.

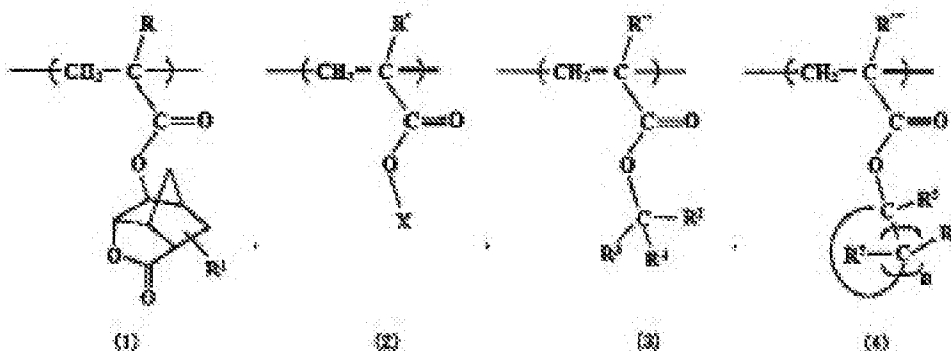
In the statement of the rejection the Examiner asserted that Watanabe et al. disclose a terpolymer which “meets the claimed acrylic resin lacking only the biocycloheptane carbolactone comonomer.” The Examiner also asserted that Momota et al. disclose the functional equivalence of butyrolactone and the bicocycloheptane carbolactone, referring to paragraph [0073]. The Examiner then concluded that one having ordinary skill in the art would have been led to modify the terpolymer disclosed by Watanabe et al. by employing a bicycloheptane carbolactone in lieu of butyrolactone as a functional equivalent, motivated by reasonable expectation of obtaining results similar to those disclosed by Watanabe et al. This rejection is traversed.

The Examiner’s rejection is based upon an erroneous interpretation of the claimed invention vis-à-vis the terpolymer disclosed by Watanabe et al., because the bicocycloheptane carbolactone comonomer is **not the only difference** between the claimed acrylic comonomer and the terpolymer disclosed by Watanabe et al. Further Momota et al. do **not** disclose the universal

equivalence of butyrolactone and bicycloheptane carbolactone, let alone for the specific purpose of Watanabe et al., thereby undermining the asserted motivation. Lastly, even **if** the applied references are combined as proposed by the Examiner, the claimed invention would **not** result.

The Claimed Invention

The claimed invention is directed to an acrylic polymer comprising a recurring unit (i) represented by the following formula (1) , a recurring unit (ii) represented by the following formula (2) , and an acid-labile group--containing recurring unit (iii) that contains at least one unit selected from a recurring unit represented by the following formula (3) and formula (4),



wherein, in the formulas (1) to (4), R, R', R'', and R''' individually represent a hydrogen atom, methyl group, or trifluoromethyl group;

in the formula (1), R¹ represents a hydrogen atom, linear or branched alkyl group having 1-4 carbon atoms, linear or branched alkoxy group having 1-4 carbon atoms, or linear or branched fluoroalkyl group having 1-4 carbon atoms;

in the formula (2), X represents a polyalicyclic hydrocarbon group consisting only of carbon and hydrogen and having 7-20 carbon atoms;

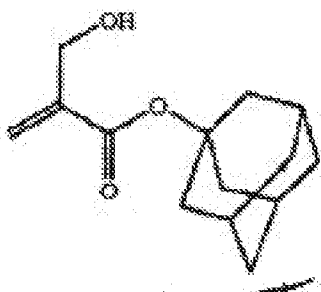
in the formula (3), R^2 and R^3 individually represent a linear or branched alkyl group having 1-4 carbon atoms and R^4 represents an alicyclic hydrocarbon group having 4-20 carbon atoms, and

in the formula (4), R^5 represents a linear or branched alkyl group having 1-4 carbon atoms, R^6 and R^7 individually represent a hydrogen atom or a linear or branched alkyl group having 1-4 carbon atoms, and n represents an integer of 3-7.

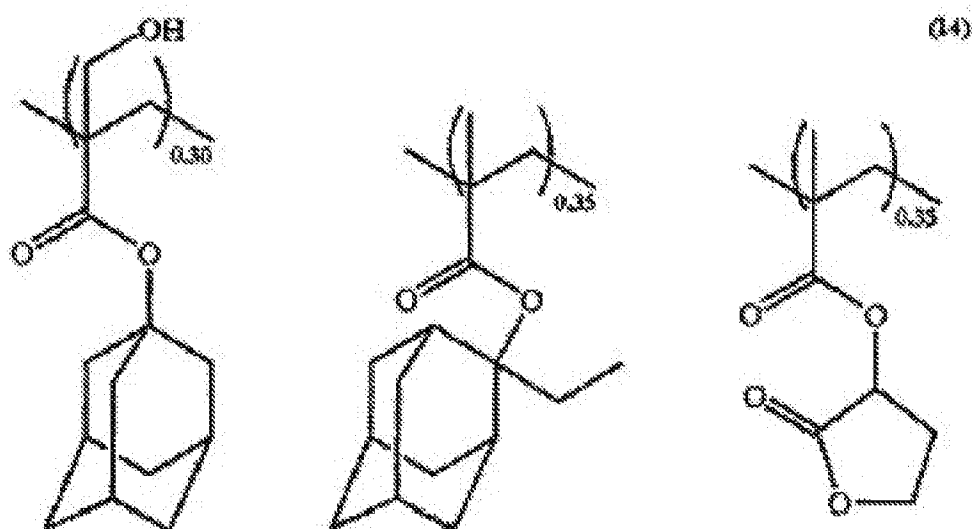
Since the claimed acrylic polymer comprises the recurring unit (i) of the formula (1), the recurring unit (ii) of the formula (2), which has a polyalicyclic hydrocarbon group not containing a polar group and consisting only of carbon and hydrogen on the side chain, and an acid-labile group-containing recurring unit (iii) represented by the formula (3) and/or formula (4), it follows that the acrylic polymer possesses a **combination** of basic properties as a chemically amplified resist sensitive to active radiation, particularly to deep ultraviolet rays represented by an ArF excimer laser, such as high **transparency** to radiation, high **sensitivity** and superior resolution. In addition, the acrylic polymer can reduce not only **pattern line edge roughness** after resolution, but also dependency on post exposure bake 4hereinafter called “**PEB**”). This **combination** of advantageous properties is neither disclosed nor suggested by the applied prior art.

Watanabe et al.

Watanabe et al. disclose an alicyclic methacrylate having an oxygen substituent group on its α -methyl group, represented by a specific formula; 1-adamantyl α -(hydroxymethyl) acrylate shown by the following formula is a typical example (Example 7).



The polymer actually obtained by Watanabe et al. and identified as Reference Example 1 consists of the following three recurring units derived from the above-mentioned 1methacrylate and the other two respectively, where the left recurring unit comes from the above-mentioned methacrylate.

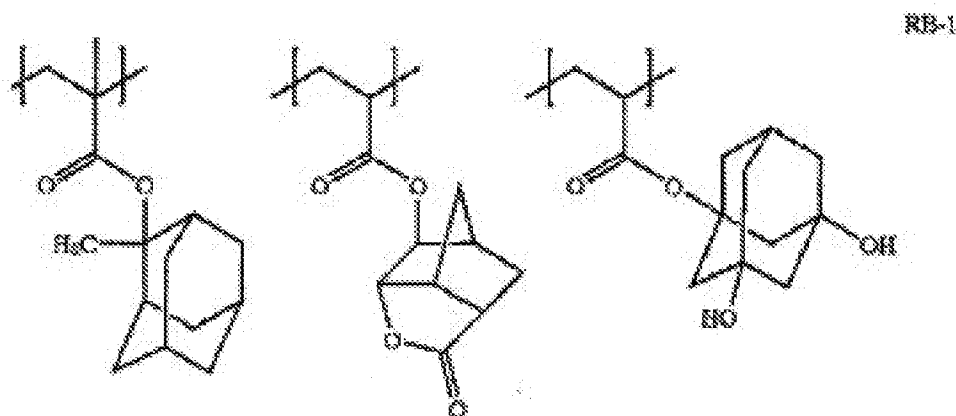


In Reference Example 2-4 of Watanabe, it is shown that the polymer has improved **resolution**, sufficient **transparency**, and better **dry etching resistance** as a photoresist material.

Momota et al.

Momota et al. disclose a photoresist resin composition comprising a resin containing recurring units derived from, acrylic acid ester derivatives represented by specific formulas.

The resin (RB-1) consisting of the recurring units shown by the following formulas is a typical example (see synthesis Example 3, Tables 3 and 6).



In Example of Momota et al., for each example, the reduction of the generation of **cracking** at shrinking a hole pattern by a thermal flow process is demonstrated. The excellence in the **dry etching resistance** of each example is also shown (see Table 5-6).

Arguments for Nonobviousness

Initially, the Examiner's determination as to the single noted difference between the claimed invention and the terpolymer disclosed by Watanabe et al. is inaccurate. Specifically, the Examiner asserted "This copolymer meets the claimed acrylic resin lacking only the bicycloheptane carbolactone comonomer." This statement is not accurate.

It is apparent and would have been recognized by one having ordinary skill in the art that **the left recurring unit shown in formula (14) of Watanabe et al. meets none of the formulas (1)-(4) of claim 1, in which none of R, R', R'' and R''' is a hydroxyl group.** Accordingly, even **if** the right recurring unit in the formula (14) of Watanabe et al. (i.e., the recurring unit having butyrolactone) is replaced by the middle recurring unit in the formula RB-1 of Momota et al. (i.e., the recurring unit having bicycloheptane carbolactone), and Applicant does **not** agree

that the requisite realistic motivation has been established, the claimed acrylic polymer would **not** result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044 (Fed. Cir. 1988).

On this basis alone, the imposed rejection under 35 U.S.C. § 103 cannot stand. Further, there are additional reasons that undermine the obviousness conclusion.

Watanabe et al. Teach Away From the Claimed Invention

Watanabe et al. **teach away** from preparing a polymer having no oxygen substituent on its α -methyl group as a monomer. See, for example, paragraph [0004] of Watanabe et al. Therefore, not only is the requisite motivation lacking but such a teaching away from the claimed invention constitutes a potent indicum of **nonobviousness**. *Ecolchem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361 (Fed. Cir. 2000); *In re Bell*, 991 F.2d 781 (Fed. Cir. 1993); *Specialty Composites v. Cabot Corp.*, 845 F.2d 981 (Fed. Cir. 1988).

Momota et al. Do Not Teach Universal Functional Equivalence

In addition to the foregoing reasons, the imposed rejection cannot stand for lack of the requisite realistic motivation, because there is **no** teaching of universal equivalence by Momota et al. Specifically, the Examiner asserted that Momota et al. disclose the functional equivalence of butyrolactone and bicycloheptane carbolactone. However, it is apparent that whatever functional equivalence is disclosed by Momota et al. is **confined** to the **particular** resin disclosed by Momota et al. wherein the **right recurring unit in the formula RB-1 is a recurring unit derived from dihydroxy adamantly acrylate**. However, **no** such recurring unit exists in the terpolymer disclosed by Watanabe et al. It is well settled that equivalence for one purpose does **not** carry with it equivalence for any and all other purposes particularly in different chemical compounds, wherein unpredictability scotches the requisite reasonable

expectation of success . *In re Mercier*, 515 F.2d 1161 (C.C.P.A. 1975); *In re Vogel*, 422 F.2d 438 (C.C.P.A. 1970); *In re Jezl*, 396 F.2d 1009 (C.C.P.A. 1968); *In re Naylor*, 369 F.2d 765 (C.C.P.A. 1966).

The bottom line is that Momota et al. do **not** suggest replacing butyrolactone in the polymer disclosed by Watanabe et al. with bicycloheptane carbolactone.

Evidence of Nonobviousness

The Examiner, of course, is required to consider all evidence of **nonobviousness**, including evidence in the specification. *In re Soni*, 54 F.3d 746 (Fed. Cir. 1995); *In re Margolis*, 785 F.2d 1029 (Fed. Cir. 1986). Examples in the written description of the specification present experimental data confirming the excellence of the polymer defined by claim 1 with respect to a **combination** of properties: **sensitivity, resolution, transparency, pattern line edge roughness** and **PEB**. This data contrasts with experimental data disclosed by Watanabe et al. which relates only to resolution, transparency, and dry etching resistance. Similarly, Momota et al. only present experimental data with respect to the reduction of cracking and dry etching resistance. Accordingly, the advantageous **combination** of properties exhibited by the claimed polymer cannot be forecast or achieved from Watanabe et al. and Momota et al.

Summary

Based upon the foregoing it should be apparent that a *prima facie* case of obviousness has **not** been established for **lack** of the requisite **factual basis** and lack of the requisite realistic **motivation**. Further, as previously pointed out, even **if** the applied references are combined as proposed by the Examiner, and again Applicant does **not** agree that the requisite realistic motivation has been established, the claimed invention would **not** result. *Uniroyal, Inc. v.*

Rudkin-Wiley Corp., supra. Moreover, upon giving due consideration to the evidence of **nonobviousness** of record, the conclusion appears inescapable that one having ordinary skill in the art would **not** have found the claimed subject matter **as a whole** obvious within the meaning of 35 U.S.C. § 103. *In re Piasecki*, 745 F.2d 1468 (Fed. Cir. 1984). Applicant, therefore, submits that the imposed rejection of claims 1 through 8 under 35 U.S.C. § 103 for obviousness predicated upon Watanabe et al. and Momota et al. is not factually or legally viable and, hence, solicits withdrawal thereof.

Based upon the foregoing it should be apparent that the imposed rejection has been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, solicited. If any unresolved issues remain, it is respectfully requested that the Examiner telephone the undersigned attorney at 703-519-9954 so that such issues may be resolved as expeditiously as possible.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 504213 and please credit any excess fees to such deposit account.

Respectfully Submitted,

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